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Comparison between Stationary and Crawling Multi-Arm Robotics for In-Space Assembly

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Abstract

In-space assembly (ISA) is the next step to building larger and more permanent structures in orbit. The use of a robotic in-space assembler will save on costly and potentially risky EVAs. Determining the best robot for ISA is difficult as it will depend on the structure being assembled. A comparison between two categories of robots are presented: a stationary robot and robot which crawls along the truss. The estimated mass, energy, and time are presented for each system as it, in simulation, builds a desired truss system. There are trade-offs to every robot design and understanding those trade-offs is essential to building a system that is not only efficient but also cost-effective.